Shelf-life Extension and Inhibition of Undesirable Bacteria in Steamed Mackerel Fish Product by Lactic Acid Bacteria

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Abstract: Steamed mackerel fish (SMF) is a unique main dishfood in Thailand. The SMF exported to Muslim countries has increased steadily. The shelf-life of SMF is very short (less than 3 days) at room temperature (RT) due to the spoilage caused by undesirable bacteria. Therefore, extension of shelf-life of SME by reducing the spoilage bacteria will greatly enhance these food products to export in Muslim countries. In this study, Lactobacillus plantarum PMU33 and Lactococcus lactis WNC20 which, produced bacteriocin (plantaricin W and nisin Z) were able to extend the shelf-life of SME and reduce spoilage at RT. The results showed that mixed strains of lactic acid bacteria (LAB) with the ratio of 1:1 in SMF boiled water + 1% glucose as a medium at 35 °C for 72 h, is optimal for bacteriocin producing condition. After 72 h, the pH of LAB liquid culture was lower than 3.12 and the viable cell count reached to 3.0 x 10^7 CFU/mL. When SMF was dipped in LAB liquid culture containing initial LAB load was 3.0 x 10^3 CFU/g for 3 min, the shelf-life extended more than 20 days at RT, while retain its color, flavor and texture. The sensory evaluation of SMF dipped in LAB liquid culture and the SMF collected from market were performed by 10 panel member selected from Institute of Food Research and Product Development, Kasetsart University. The results of the sensory evaluation revealed that the appearance, color, odor, texture and overall acceptability of SMF dipped with LAB liquid culture were more acceptable than the market collected SMF. Therefore, the result of this study suggested that dipping SMF in bacteriocin producing LAB liquid culture for 3 min could be able to extend the shelf-life of the products at room temperature and thereby will enhance export marketing.

Key words: Steamed mackerel fish, shelf-life extension, bacteriocin, lactic acid bacteria.